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SYRINGONOMUS TYPICUS NEW GENUS, NEW SPECIES (ENOPLIDA: LEPTOSOMATIDAE) A MARINE NEMATODE INHABITING ARENACEOUS TUBES.

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Several collections of marine nematodes have been obtained from epibenthic trawls taken by the Woods Hole Oceanographic vessel, ATLANTIS II, on transects from Woods Hole, Massachusetts to Bermuda. Numerous specimens in one of these collections were partially enclosed in tubes, the latter usually cylindrical in shape and constructed of adhering particles of sand. The lengths of the tubes vary considerably due in part to breakage, but each has similar construction, and, with few exceptions, each accommodated a single nematode. Thirty-nine nematodes were removed from tubes and examined more carefully. Of this number, six are of species as yet unidentified. The remaining 33 are males, females and juveniles of a new genus and new species described below:

Syringonomus new genus

Diagnosis: Same as that of Leptosomatinae Filipjev, 1916. Body slightly tapered anteriorly and posteriorly. Cuticle smooth. Tail bluntly conical. Cephalic setae short. Cephalic capsule present, but apparent only in optical section. Amphid a small, indistinct pore. Stoma unarmed. Eyespots absent. Gubernaculum consisting of small, paired structures, lateral to distal ends of spicula; corpus of gubernaculum and lateral anterior projection absent. Setiform subventral supplements present, ventromedian supplements absent. Caudal glands and spinneret present.

Etymology: The name *Syringonomus* is derived from the Greek *Syringos* meaning tube, and *nomos* meaning a place for living.

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Syringonomus typicus new species

Specimens: *Holotype* (Male): National Museum of Natural History Number 39489.

Allotype (Female): National Museum of Natural History Number 39493.

Paratypes (Males): National Museum of Natural History Numbers 39490 thru 39492.

Paratypes (Females): National Museum of Natural History Numbers 39494 thru 39515.

Paratypes (Juveniles): National Museum of Natural History Numbers 39516 thru 39539.

Measurements:

Holotype: L = 5.377 mm; a = 65.9; b = 7.3; c = 37.9

Allotype: L = 4.936 mm; a = 40.1; b = 7.1; c = 41.8; V = 61.5.

Male Paratypes*: L = 6.061 mm; a = 64.1; b = 8.5; c = 42.7.

L = 5.979 mm; a = 64.6; b = 8.3; c = 48.6.

Female Paratypes:

L = 3.32 – 4.94 mm	(4.23 mm ± 0.51 mm)
a = 31.5 – 46.4	(38.5 ± 4.3)
b = 5.4 – 7.1	(6.3 ± 0.6)
c = 23.1 – 51.0	(40.8 ± 7.9)
V = 51.6 – 66.2	(63.4 ± 3.8)

Description: Body slender and gradually tapering anteriorly (Fig. 1B); posteriorly, body of nearly uniform diameter to level of anus, then tapering to form bluntly conical tail (Figs. 2A and B). Head diameter at level of cephalic setae 30.0 μ – 34.7 μ (32.3 μ ± 1.5 μ). Body diameter at base of esophagus 71.0 μ – 89.5 μ (82.6 μ ± 7.3 μ) in males, 76.5 μ – 102.0 μ (91.6 μ ± 7.4 μ) in females**; at mid-body length 81.5 μ – 96.0 μ (91.6 μ ± 5.8 μ) in males, 83.0 μ – 126.0 μ (110.5 μ ± 13.7 μ) in females; at level of anus 76.5 μ – 100.0 μ ± 6.7 μ).

Cuticle smooth. Head with circle of six cephalic papillae and second circle of 10 cephalic setae (Figs. 1A and B); longer cephalic setae 4.0 μ – 6.0 μ, shorter 2.5 μ – 4.7 μ. Distance from anterior extremity of head to level of cephalic setae 12.0 μ – 19.0 μ (14.3 μ ± 2.1 μ). Somatic setae equally short and sparse. Amphid an obscure circular pore approximately 1.0 μ in diameter, located 14.4 μ – 23.3 μ (19.6 μ ± 2.3 μ) from anterior extremity of head (Figs. 1A and C). Males with inverted lyre-shaped pattern on cuticle immediately posterior to amphid; pattern crenate and with (Fig. 1C) or without posteriorly directed central process. Cuticle thickened at level of pattern (Fig. 1C). Cephalic capsule present, but situated anterior to cephalic setae and visible in optical section only (Figs. 1A, B, and C).

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* One male sectioned.

** Measurements of males are given separate from those of females only where the mean values appear to differ significantly; otherwise measurements of males and females are combined.

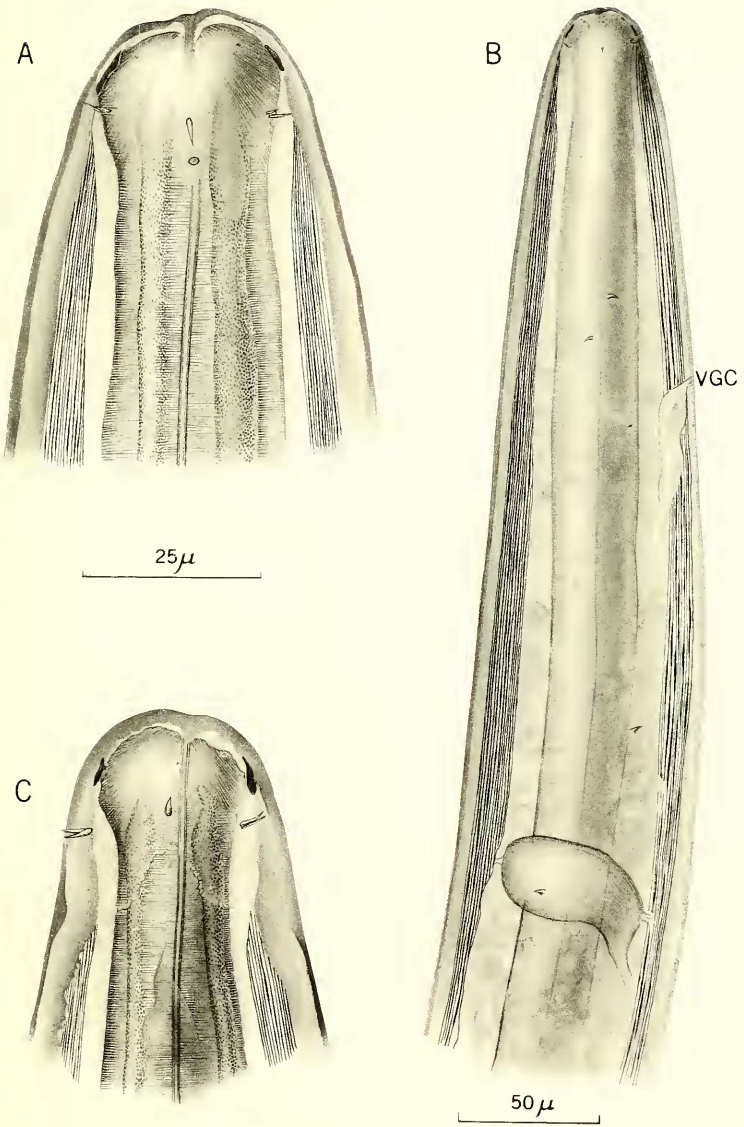

FIG. 1. *Syringonomus typicus* new species. A. Lateral view of female head (allotype). B. Lateral view of head and neck of female (allotype). Ventral gland cell, VGC. C. Lateral view of male head (holotype).

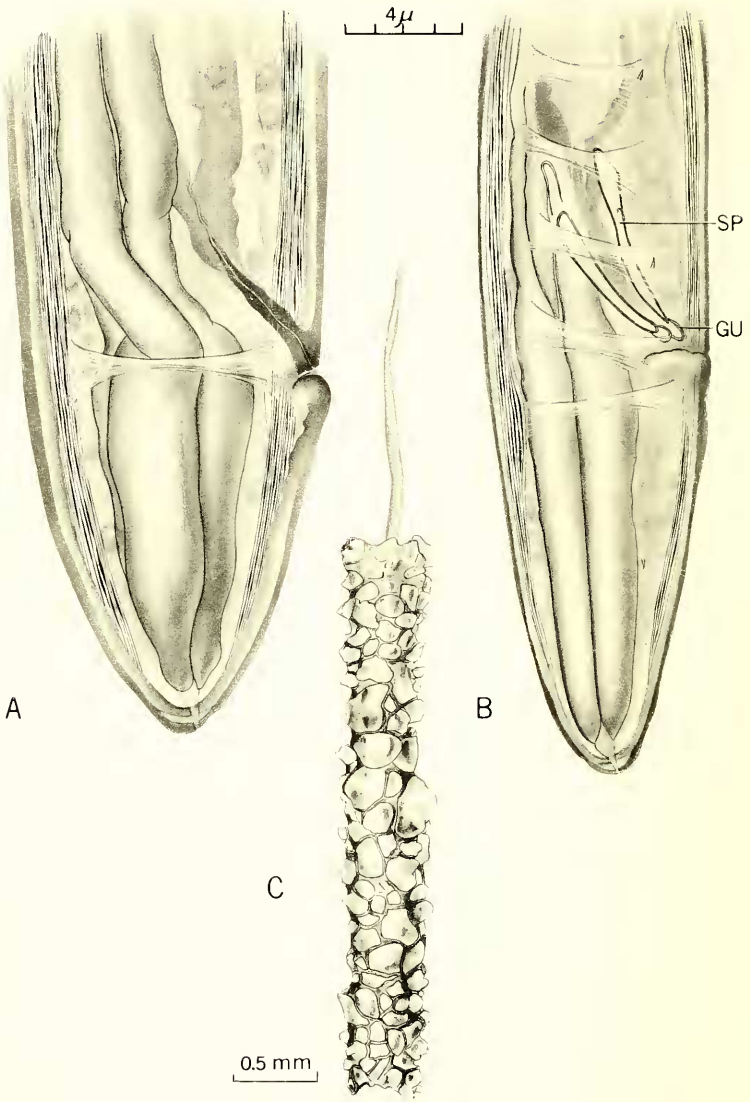

Fig. 2. *Syringonomus typicus* new species. A. Lateral view of female tail (allotype). B. Subventral view of male tail (holotype). *Spiculum*, SP; Gubernaculum, GU. C. Anterior end of specimen extending from arenaceous tube.

Head rounded without lips or microlabia. Stoma narrow, not morphologically distinct from lumen of esophagus. Teeth absent (Figs. 1A and C).

Some specimens with indistinct duct and pore of ventral gland (Fig. 1B), apparently absent in others. Distance from anterior extremity of head to ventral gland pore 15.0 – 24.6 (19.2 ± 4.0) per cent of esophagus length.

Esophagus cylindrical, 628 μ – 790 μ (717 μ ± 58 μ) long in males, 556 μ – 717 μ (664 μ ± 45 μ) in females. Eyespots absent. Pseudocoelom with large, lobate cell on each lateral side of esophagus base.

Caudal glands outstretched and extending anterior to rectum. Cuticle of tail terminus with median, crescent-shaped lamella. Caudal gland pore slightly ventral to terminus. Caudal setae sparse, terminal setae absent.

Males—Diorchic, testes opposed and outstretched. Spicula paired, equal in length, slightly arched, and 72 μ to 75 μ long. Gubernacula small, tube-like structures, one lateral to distal end of each spiculum; apophyses and lateral anterior projections absent (Fig. 2B). Dorsoventral copulatory muscles sparse, posterior region of body not curved ventrally. Each side of body with two to four setiform subventral supplements; setae approximately 3 μ long, first pair 30 μ to 37 μ, second 113 μ to 120 μ, third 132 μ and fourth 149 μ anterior to cloacal vent; setae furthest anterior slightly closer to ventromedian line. Ventromedian supplements absent. Tail length 120 μ – 142 μ (131 μ ± 10 μ).

Females—Didelphic, gonads opposed and reflexed; vulva 1.87 mm – 3.17 mm (2.60 mm – 0.41 mm) from anterior end. Tail length 85 μ – 144 μ (106 μ ± 16 μ).

Type Locality: Sediment from epibenthic trawl taken between 39° 37.0′ N, 66° 47.0′ W and 39° 37.5′ N, 66° 44.0′ W at 3,806 meters depth on 24 August, 1966.

Discussion: Specimens of *Syringonomus typicus* possess characters typical of the subfamily Leptosomatinae. They most closely resemble species of the genera *Leptosomella* Filipjev, 1925, *Leptosomatides* Filipjev, 1918, *Paraleptosomatides* Mawson, 1956, *Leptosomatina* Allgen, 1951, and *Leptosomatum* Bastin, 1865. *Leptosomella* differs in having long cephalic setae and an acutely conical tail. *Leptosomatides* and *Paraleptosomatides* differ in having complex gubernacula, supplements, and well developed, setiform, subventral supplements, the more anterior ones on cuticular elevations. *Leptosomatina* differs in having long cephalic setae, armed stoma, and complex gubernaculum with caudally directed apophyses. Finally, *Leptosomatum*, whose members most closely resemble *Syringonomus*, differs in not having the lyre-shaped pattern and thickened cuticle on the head of the males. By the latter two characters, *Syringonomus* may be distinguished also from all other genera of this subfamily.

The presence of a ventral excretory cell is insufficiently documented to be relied upon at this time as a diagnostic character.

A striking feature of the specimens under consideration is that they were found inhabiting hollow, cylindrical tubes constructed of sand parti-

cles and an adhesive mortar. The lengths of the tubes range from 1.0 mm to 3.0 mm, and the width from 0.5 mm to 2.0 mm. The diameter of the sand particles in the tubes range from 138 μ to 588 μ with an average diameter of 362 μ. The average diameter of sand particles from the tube constructed of the finest sand was 189 μ, and 428 μ in the case of the tube constructed of the coarsest particles. The particles are primarily quartz.

The lumen of each tube is lined with a thin layer of what is presumed to be identical to the mortar between sand particles. The lining varies from light yellow in some tubes to dark brown in others. The lining and mortar become dark blue when treated with equal volumes of 2 percent hydrochloric acid and 2 percent postassium ferrocyanide demonstrating both contain ferric compounds.

Of particular interest is the question of whether or not *Syringonomus typicus* is responsible for the construction of the tubes. Obviously, the organism involved must possess a means of producing the lining and mortar. Many marine nematodes possess caudal glands that secrete an adhesive, usually employed for attachment to a substrate, and many possess lateral hypodermal glands, the function of which is as yet unknown. While no nematodes are known to construct tubes, either or both kinds of glands could conceivably secrete a substance that would serve as mortar in forming arenaceous tubes. If this were the case, one might expect the glands involved to be particularly well-developed and perhaps modified in other respects. However, specimens of *Syringonomus typicus* do not have what could be readily identified as lateral hypodermal glands, and while they do possess caudal glands and a spinneret, they are not exceptionally well-developed or unusual in other respects. Therefore, while it appears that this species of nematode is an inhabitant of these tubes, there is little evidence to suggest they construct them.

Our further attempts to learn the identity of the organism responsible for construction of the tubes resulted in their being examined by a taxonomist of foraminiferans, who identified them as tubes most likely constructed by *Rhabdammina abyssorum* M. Sars, 1868. Descriptions of the general features of the test of this species are given by Carpenter (1875) who has found that the test is typically triradiate, the rays diverging at equal angles from a central cavity and each ray with an orifice at its extremity. He states further, however, that quadri- and pentaradiate forms occur as well as single, straight tubes. The latter form "often exceeds half an inch" in length.

The walls of the test of this species, according to Brady (1884), are composed chiefly of coarse sand, the grains of which are variable in size. Brady also found that the walls of tests from the North Atlantic are various shades of light reddish-brown, and chemical analysis of the mordant demonstrated the presence of peroxide of iron.

The descriptions of the test of this foram closely conform to that of the tubes inhabited by the nematodes, except that the latter are shorter and always in the form of a straight tube. It is concluded, therefore, that the

specimens of *Syringonomus typicus* in our collections are within broken pieces of the tests of *Rhabdammina abyssorum*. To what extent these nematodes dwell in these tubes, and to what extent, if at all, they are ecologically adapted to a tube-dwelling existence, must await further study.

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Literature Cited

Allgen, C. A. 1951. Papers from Dr. Th. Mortensons Pacific Expedition, 1914–1916. LXXVI. Pacific Freeliving Marine Nematodes. Videnskabelige Meddelelser Dansk Naturhistorisk Forening, Copenhagen 113: 262–411.

Bastian, H. C. 1865. Monograph on the Anguillulidae or Free Nematoids, Marine, Land and Freshwater with Descriptions of 100 New Species. Transactions of the Linnean Society of London 25(2): 73–184.

Brady, H. B. 1884. Report on the Foraminifera collected by H. M. S. Challenger during the year 1873–1876. Report on the Scientific Results of the Voyage of H. M. S. Challenger during the years 1873–1876 IX: 1–814. Plates 1–115.

Carpenter, W. B. 1875. The Microscope and its Revelations. Fifth Edition. J. and A. Churchill, London. 848 pp.

Filipjev, I. N. 1916. Les Nematodes libres contenus dans les Collections du Musee Zoologique de l'Acad. Imp. des Sciences de petrograd. Extrait de l'Annuaire du Musee Zoologique de l'-Acad. Imp. des Sci. 21: 59–116.

————. 1918. Svobodnozhivushchiya Morskiya Nematody Okrestnostei Sevastopolya. Trudy osoboi Zoologicheskoi Laboratorii I Sevastopol 'Skoi Biologicheskoi St. Antsii Rossiiskoi Akademii Nauk, Series II(4): 1–350. (Translated from Russian. Israel Program for Scientific Translation Jerusalem, 1968).

————. 1925. Les Nematodes libres des mer septentrionales á la famille des Enoplidae. Archiv für Naturgeschichte 91: 1–216.

Mawson, P. M. 1956. Freeliving Nematodes. Section 1: Enopoloidea from Antarctic Stations. British-Australian-New Zealand Antarctic Research Expedition 6(3): 39–74.